

SOROKIN, O. V.

✓ 3061. Sorokin, O. V., On expression of stress relaxation curves for metals by exponential functions (in Russian), *Izv. Akad. Nauk SSSR Otd. tekhn. Nauk* no. 11, 1616-1617, Nov. 1953.

62 Author investigates two Oding's exponential equations of stress relaxation in metals in an effort to establish a degree to which these equations reflect the relaxation process. Stress $\sigma(t)$ at any instant t is equal to the reduced initial stress σ_0 . The reduction factor is an exponential function with the base e . The exponent is a ratio, with the negative sign, of t and $n(t)$. Author defines the function $n(t)$ as a relaxation time and finds a relationship between $n(t)$ and t . Since the relaxation curve is exponential, then the logarithmic derivative of stress, taken with the negative sign, will be equal to the inverse of n . This quantity is known as the speed of the relaxation process. If the exponential function does not coincide with the relaxation curve, then the curve representing this function will have one more intersection with the relaxation curve in addition to the initial common point. Hence the entire actual relaxation curve may be represented by a family of exponential functions. Then each point on a curve is defined by an exponential with a particular value of $n(t)$ which reduces the initial stress σ_0 at instant t to actual value $\sigma(t)$. Author observes that, as a rule, such equations correctly reflect the relaxation process in metals.

V. A. Valey, USA

Sorokin, O. V.

USSR

539,434

5052. Relation between creep and relaxation of
stress. L. A. OPINO, O. V. SOROKIN AND N. D.
SAZONGVA. Dokl. Akad. Nauk SSSR, 92, No. 3,
565-8 (1953) In Russian. English translation, U.S.
National Sci. Found. NSF-ir-152.

Creep under constant stress, and stress relaxation
at constant strain are considered to be two special
cases of creep under arbitrary stress variations and
attempts to relate curves for the two are made. It is
shown that the variations with heat treatment for
each is consistent, in certain steels, with this view,
and it is concluded that a steel cannot be resistant
to creep and not to stress relaxation. W. M. LOMER.

Sorokin, O. V.

137-1957-12-25416

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 351 (USSR)

AUTHORS: Sorokin, O. V., Tulyakov, G. A.

TITLE: An Installation for Creep-Testing of Metals Under Combined Stresses (Tension With Torsion) [Ustanovka dlya ispytaniya metallov na polzuchest' pri slozhno-napryazhennom sostoyanii (rastyazheniye s krucheniyem)]

PERIODICAL: V sb.: Prochnost' metallov. Moscow, 1956, pp 50-54

ABSTRACT: A critical survey of a series of methods and various equipment for creep-testing of metals under various load conditions. Creep studies of metals exposed to combined stresses under action of tension and torsion, were carried out on a re-designed testing machine of the IP-2 type. Maximal load on the specimen comprised a 3000-kg tension and a 15-kgm torsion. The design of the machine permits the testing of three types of stress conditions: Pure tension, pure torsion, and a combination of tension and torsion. Specimens being tested on the machine are hollow cylinders with diameters of 25 mm and 22 mm and a length of 100 mm. Torque (T) is transmitted to the specimen by means of a disc of constant radius, secured to the upper gripping assembly by means

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137-1957-12-25416

An Installation for Creep-Testing of Metals Under Combined Stresses

of a key. The turning effort is transmitted to the disc by means of thin wire cables, which pass over pulleys mounted on the housing of the machine. In order to prevent skewing when T is applied, the lower assembly is equipped with an additional, spherical bearing. Axial and angular deformations are registered on a specially designed extensometer, employing micrometer indicators (two of which record tension, while the third registers torsion), with graduations of 0.002 mm each. In order to prevent torsional forces from affecting the readings of the tension indicators, and vice versa, the supporting plates may be regulated by means of adjusting screws. The modified machine operated quite satisfactorily during long periods of creep testing at elevated temperatures.

Z.F.

1. Metals-Creep-Testing equipment
2. Metals-Creep-Test methods

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SOROKIN, O.V.
USSR/Electricity - Semiconductors

G-3

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 12190

Author : Kaganer, V.E., Regel', A.R., Sorokin, O.V.

Inst : -

Title : Effect of Ion Bombardment on the Detecting Properties of Semiconductors.

Orig Pub : Sb. statey Leningr. in-ta tochnoy mekhan. i optiki, 1955, vyp. 18, 126-141

Abstract : An investigation was made of the influence of ion bombardment (IB) on the voltage-current characteristics of a point contact Si, Ge, SiC, PbS, and SbZn with tungsten. The ion bombardment was carried out with ions of hydrogen, air, oxygen, benzene, tellurium, and manganese, in order to obtain p-n and p-n-p junctions on the surface of the crystals. The effect of ion bombardment on the rectifying properties of the crystals was established as a function of the initial treatment of the semiconductor, of the

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the bombarded surface of the semiconductor takes place most strongly, when the bombarding ion is capable of entering into a chemical bond with the element that forms the semiconductor or else with its surface layer. The most noticeable influence of ion bombardment appears with semiconductors having the purest composition. By means of ion bombardment it is possible to produce between surfaces contact that normally are difficult to produce by other means. Ion bombardment can improve and worsen the rectifying properties of a semiconductor and are not a guaranteed universal means of obtaining good detectors, as was stated by Russel (Russel, S., Bell System Technical Journal, January 1952). In many cases the ion bombardment in itself or in combination with other types of surface treatment makes it possible to obtain good detectors. The best

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Abs Jour : Ref Zhur - Fizika, No 5, 1957, 12190

detector obtained by means of ion bombardment was with n- and p-SiG. Bombardment of n-germanium by ions of air, hydrogen, or benzene vapors with subsequent polishing and etching for ten minutes in 3% solution of H_2O_2 , increases substantially the rectification coefficient and the inverse voltage (to 100 volts). In all cases, ion bombardment of crystals has led to a change in the form of the voltage-current characteristics, without improving the rectifying properties of the specimens.

SOROKIN, O.V.

SUBJECT

USSR / PHYSICS

CARD 1 / 2

PA - 1839

AUTHOR

SOROKIN, O.V.

TITLE

On Measuring the Velocity of Surface Recombination in a thin Semiconductor Sample with Qualitatively Different Boundary Surfaces.

PERIODICAL

Zurn.techn.fis, 26, fasc. 11, 2467-2472 (1956)
Issued: 12 / 1956

At first the continuity equations for the currents of holes and electrons in a semiconductor are written down in a general form. The present work investigates the solution of these equations for the concrete case that the following equations are satisfied: 1.) Stationary distribution of holes and electrons. 2.) Within the crystal domain investigated no holes or electrons are produced under the effect of external exciting factors. 3.) The crystal is assumed to be electrically neutral. 4.) The entire electric current passing through the crystal is assumed to be equal to zero. The following relations then hold good in the case of any geometric conditions of the sample:

$\vec{I}_p = -qD \nabla \Delta p$, $\vec{I}_n = -qD \nabla \Delta n$ with $D = (n+p)/((n/D_p) + (p/D_n))$. Here \vec{I}_n and \vec{I}_p denote the current density of electrons and holes respectively, q - the absolute value of the electron charge, n and p - concentration of electrons and holes respectively, D_n and D_p - diffusion coefficients of electrons and holes respectively, τ - life of additional current carriers. The aforementioned continuity equations are then simplified as follows: $\Delta p/\tau = -q^{-1} \operatorname{div} \vec{I}_p$, $\Delta n/\tau = q^{-1} \operatorname{div} \vec{I}_n$. If the

SOROKIN, O.V.

SUBJECT
AUTHOR
TITLE

USSR / PHYSICS
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PA - 1840

PERIODICAL

On Measuring the Life of the Diffusion Coefficient and of the Velocity of the Surface Recombination of Current Carriers not in Equilibrium in a Thin Semiconductor Sample
Zurn.techn.fis, 26, fasc.11, 2473-2479 (1956)
Issued: 12 / 1956

A bundle of light, which produced electrons and holes in the semiconductor, moves above the here investigated plane, thin semiconductor sample with constant velocity. The author investigates the distribution of the current carriers which are not in equilibrium over the volume of the semiconductor sample for the concrete case that the following conditions are satisfied: 1.) The crystal is electrically neutral, 2.) No electric current passes through the crystal. The following continuity equations then hold good in the case of any geometric conditions of the samples: $(\partial/\partial t) \Delta p = D \operatorname{div} \nabla \Delta p - (\Delta p/\tau) + g$, $(\partial/\partial t) \Delta n = D \operatorname{div} \nabla \Delta n - (\Delta n/\tau) + g$. Here it holds that $D = (n+p)/((n/D_p) + (p/D_n))$, and D_n and D_p denote the diffusion coefficient of the electrons and holes respectively, n and p - concentration of electrons and holes respectively, Δn and Δp - concentration of excess electrons and holes (which are not in equilibrium, τ - life of current carriers which are not in equilibrium, g - production velocity of electrons and holes in the volume unit under the effect of external exciting factors. Δn and Δp are considered to be sufficiently small quantities. It is now shown that the same bound-

SOROKIN, O. V.

109-5-20/22

AUTHOR:

SOROKIN, O. V.

TITLE:

Squaring of an Electric potential by means of the Semiconductor Device. (Kvadratirovaniye elektricheskogo napryazheniya pri p^{ro}-shchi poluprovodnikovogo ustroystva, Russian)

PERIODICAL:

Radiotekhnika i Elektronika, 1957, Vol 2, Nr 5, pp 664-665 (U.S.S.R.)

ABSTRACT:

Reference is made to the paper by G.YE.PIKUS in Zhurnal Tekhn.Fiz. 1956, Vol 26, pp 22-50. The equation set up there for the modification of the specific electric resistance of a semiconductor sample in the magnetic field has a second term, which is proportional to EH, besides the usual term, which is proportional to H^2 . Here the formula for the second term is set up for the case in which the field H is directioned parallel to the axis oz while the electric field E is directioned parallel to the axis ox, and it is said that, according to experimental results obtained by the author, the ranges of application for this formula are in reality not so rigid as described in the aforementioned paper by PIKUS. (With 2 Illustrations and 1 Slavic Reference).

ASSOCIATION:

Institute for Semiconductors of the Academy of Science of the U.S.S.R. (Institut poluprovodnikov Akademii nauk SSSR)

PRESENTED BY:

SUBMITTED:

22.11.1956

AVAILABLE:

Library of Congress

Card 1/1

Sorokin, O.V.

109-10-9/19

AUTHOR: Sorokin, O.V.

TITLE: Square Law Detection by Means of a Semi-conductor Device (Kvadratichnoye detektirovaniye pri pomoshchi poluprovodnikovogo ustroystva)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, No.10, pp. 1293 - 1294 (USSR).

ABSTRACT: On the basis of the theory derived by G.E. Pikus (Ref.1), it is assumed that the change in the resistance of a semiconductor plate situated in a magnetic field H (see Fig.1) is expressed by Eq.(1). If a voltage $U = U_0 \cos \omega t$ is applied to the plate in the direction of the axis x (see Fig.1) via an external resistance R , the voltage across the plate is in the form:

$$U_r = V_0 + U_0 \cos \omega t + U_{2\omega} \cos 2\omega t, \quad (3)$$

where V_0 is the DC voltage-component. It is shown that:

$$V_0 = AU_0^2, \quad (5)$$

from which it follows that the device can be used as a multiplier. The validity of Eq.(5) was checked experimentally for

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SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1992
 AUTHOR ŽUZE, V.P., PIKUS, G.E., SOROKIN, O.V.
 TITLE On the Problem of the Influence exercised by an Exterior Electro-
 static Field on the Velocity of Surface Recombination in Germanium.
 PERIODICAL Žurn.techn.fis, 27, fasc.1, 23-29 (1957)
 Issued: 2 / 1957

Experimental method and results: The velocity of surface recombination was measured by the methods developed by O.V.SOROKIN, Žurn.techn.fis.26,11 (1956). On this occasion the effective diffusion lengths L_a were experimentally determined, and from the values found in this way the velocities of surface recombination were computed. Investigations were carried out with rectangular plates made of monocrystalline n- and p-germanium. The upper boundary surface of the sample served for the mounting of metal probes: phosphorus bronze for n-germanium and tungsten for p-germanium. On the upper boundary surface of the sample a rectilinear stripe of $\sim 0,005$ cm width, which was vertical to the longitudinal axis of the sample, was illuminated. A mica plate which was coated with silver on one side and had a thickness of from 0,0022 - 0,0030 cm was pressed or pasted on to the lower boundary surface. An electric voltage of up to 6 kV was applied to this silver coating. The block scheme of the measuring device is shown in form of a drawing. A diagram illustrates the typical curve which is obtained on the screen of the oscillograph by bringing a probe into contact with the sample. When applying an exterior electric field to the sample the curve partly changed its shape,

Sorokin, O.V.

AUTHOR
TITLE

ZHUZE, V.P., PIKUS, G.Ye., SOROKIN, O.V.

57-6-3/36

The Determination of the Surface Recombination Rate by Means of a Change of Semiconductors Resistance in the Magnetic Field.

PERIODICAL

(Metod izmereniya skorosti poverkhnostnoy rekombinatsii po izmeneniyu soprotivleniya poluprovodnika v magnitnom pole -Russian)
Zhurnal Tekh. Fiz., 1957, Vol 27, Nr 6, pp 1167-1173 (U.S.S.R.)

ABSTRACT

A new method for the measurement of the velocity of surface recombination is described. It is based on the dependence of the resistance of a semiconductor sample in a magnetic field on the recombination velocity on its surfaces. The results of experimental checkings of this method are given. They agree well with theoretical predictions; i.e. they fully prove the theoretical final conclusions mentioned in the work of one of the authors (G.Ye. Pikus, T, 1956, Vol 26, pages 22-50) with regard to the dependence of the semiconductor-resistance in the magnetic field on the velocities of the surface-recombinations, the voltage and the frequency of the electric field, as well as on the voltage of the magnetic field. The method presented can be used for the investigation of the influence of an exterior electrostatic field and of the outer medium on the velocity of surface recombination. At present such experiments are carried out and will be published later in various works.

(1 table, 6 illustrations and 3 Slavic references).

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Inst. Semiconductors, AS USSR

Sorokin, O. V.

57-12-10/19

AUTHOR: Sorokin, O.V.

TITLE: A Method of Measuring the Volumetric Lifetime and Diffusion Coefficient of Current Carriers by the Change of Resistance of a Semiconductor in the Magnetic Field
(Metod izmereniya ob'yemnogo vremeni zhizni i koeffitsiyenta diffuzii nositeley toka po izmeneniyu soprotivleniya poluprovodnika v magnitnom pole).

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1957, Vol. 27, Nr 12, pp. 2774-2776 (USSR)

ABSTRACT: Semiconductors possessing positive and negative current carriers permit the observation of a special modification of resistance (reference 1 - 3) in a magnetic field apart from the ordinary increase of resistance connected with a decrease of the current carrier mobility and which is proportional to the square of the potential of the magnetic field. This effect is caused by a deviation of the carrier concentration from the equilibrium concentration in the case of current conduction by the semiconductor placed in a magnetic field. According to reference 1 the quantity $\theta_2 = f(d, D, \tau, \nu)$ on otherwise unchanged conditions is a

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A Method of Measuring the Volumetric Lifetime and Diffusion Coefficient of Current Carriers by the Change of Resistance of a Semiconductor in the Magnetic Field

57-12-10/19

unique function of the thickness d of the sample, of the ambipolar diffusion coefficient D , of the volumetric lifetime τ of the current carriers and of the frequency of the electric current in the sample. If the frequency-dependence of the effect obtained experimentally, that is $V_0 = \varphi(\nu)$ or $E_{2\nu} = \varphi(\nu)$, is compared with the theoretical

dependence $\Theta_2 = f(d, D, \tau, \nu)$, D and τ can be determined. Θ_2 denotes a coefficient, which is independent of the external magnetic field strength and of the electric field strength

in the sample. If $s_1 \gg \frac{D}{\lambda_0} \gg s_2$, D and τ may in the most simple way be determined from the measurements of two samples. On this occasion, the thickness of one sample must intentionally selected to be greater than λ_0 and of the other one to be smaller than this value. (λ_0 denoting the diffusion length in the semiconductor under investigation).

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SOROKIN, O. V.

103-2-7/9

AUTHORS: Pikus, G. Ye. , Sorokin, O. V. (Leningrad)

TITLE: A Non-Linear Semi-Conductor Resistance Sensitive to Magnetic Fields (Nelineynoye poluprovodnikovoye soprotivleniye, chuvstvitel'noye k magnitnomu polyu)

PERIODICAL: Avtomatika i Telemekhanika, 1958, Vol. 19, Nr 2, pp. 187-188 (USSR)

ABSTRACT: This is a letter to the editor. With reference to References 1 - 6 the formula (1) is put down and the characteristics of a linear germanium resistance with electron-conduction is investigated. At room temperature the equation (2) is then obtained ... $\Delta r = 0,083 \times 10^{-3} r_0 UH$, where Δr denotes the complete variation of the electric resistance with the sample on different conditions (according to References 1 - 6). r_0 denotes the resistance of the sample when there is no electric field present. Both are expressed in Ohms. U denotes the electric voltage at the sample in Volts. H denotes the strength of the magnetic field in Oersted. When the sample

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A Non-Linear Semi-Conductor Resistance Sensitive to Magnetic Fields 103-2-7/9

is located within the field of a constant magnet with $H = 1200$ the total resistance $r = r_0(1 + 0,1 U)$. An useful property of these non-linear resistances is the fact that the sign of the change of resistance, as it is to be seen from these formulae, depends on the direction of the electric- as well as of the magnetic field. The degree of non-linearity of the resistance can be increased if in place of a constant magnet an electromagnet is used which is fed from the same sources from which the resistances themselves are fed. In this case also the dependence of Δr on H is made use of. The magnetic field strength is changed and thus the magnitude of the change of resistance can be independently influenced. There are 6 references, 6 of which are Slavic.

SUBMITTED: May 14, 1957

AVAILABLE: Library of Congress

1. Electrons-Conduction-Mathematical analysis

Card 2/2

SOROKIN, O. V., Candidate Phys-Math Sci (diss) -- "The magnetic-concentration effect and its use for investigating the surface properties of a semiconductor". Leningrad, 1959. 15 pp (Leningrad Order of Lenin State U im A. A. Zhdanov), 200 copies (KL, No 24, 1959, 127)

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~~24(3)~~, ~~24(6)~~

AUTHORS:

Zhuze, V. P., Pikus, G. Ye., Sorokin, O. V.

67395

SOV/181-1-9-17/31

TITLE:

Application of the Magnetostriction Effect to the
Investigation of the Surface of Semiconductors 71

PERIODICAL:

Fizika tverdogo tela, 1959, Vol 1, Nr 9, pp 1420 - 1430 (USSR)

ABSTRACT:

The authors used the method of surface recombination rate measurement by means of the resistance change of a semiconductor in the magnetic field to investigate the energy surface structure of germanium. This investigation is reported here in all details. The method applied to measure the surface recombination rate is new and was introduced by the authors themselves. A description thereof is given in references 4 and 5. The aim of the investigation under review was that of demonstrating the application of this method, with two samples of n- and p-germanium being used for the purpose. Figure 1 shows the block diagram of the used setup. The method is based on the application of a formula describing the relation between the resistance change ΔR_H of a thin plane sample in the magnetic field H and the recombination rates s_1 4

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and s_2 on their opposite faces: $\Delta \rho_H / \rho_0 = 2A \mathcal{E}_y H \frac{s_1 - s_2}{s_1 + s_2 + a/\tau}$,

where d is the sample thickness, \mathcal{E}_y the voltage of the main frequency y , which is incident upon the investigated part of the sample, ρ_0 is the resistivity without magnetic field. A is

given by $A = \frac{a_n}{4} \frac{e\mu_n}{ckT} \frac{(1+b)(1+pb)pn}{(n+p)(n+pb)} \frac{d}{l}$, where n and p denote the

equilibrium concentrations of electrons and holes, μ_n and μ_p their drift mobility, $a_n \mu_n$ and $a_p \mu_p$ their Hall mobility, and

l the length of the investigated part of the sample. It is now described how it is possible, by means of the instrument, to obtain direct oscillograms reproducing the dependence of

the quantity $\frac{s_1 - s_2}{s_1 + s_2 + a/\tau}$ on the applied field. Figures 2-5 show

such oscillograms for the two samples investigated, whose characteristics are given. The next section discusses the

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Application of the Magnetostriction Effect to the
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interpretation of measuring results in detail; the results are given in the form of diagrams, and the numerical values are given in two tables. The method described is very expedient for a quick and fairly accurate determination of the field-bound change of s . A. V. Rzhanov, I. A. Arkhipova, and V. N. Bidulya (Ref 12) applied this method to investigate the modulation of s through an outer electric field. Their results, however, did not fit those by the authors in two points. This is discussed in the final part of the paper. There are 10 figures, 2 tables, and 15 references, 8 of which are Soviet.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of
Semiconductors of the AS USSR, Leningrad) 11

SUBMITTED: February 16, 1959

Card 3/3.

AUTHOR: Sorokin, O.V.

SOV/120-59-2-20/50

TITLE: An Instrument for Examining Transients on the Surfaces of Semiconductors (Ustanovka dlya issledovaniya perekhodnykh protsessov na poverkhnosti poluprovodnika)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 2, pp 68-75 (USSR)

ABSTRACT: Surface conductivity and surface recombination are examined by using the changes in carrier concentration produced by an external magnetic field. The first part of the paper (to Eq (7)) deals with the theory. An external electric field is used to perturb the equilibrium state of the semiconductor; this field is such as to induce a surface charge density of 1.25×10^{11} electron units per cm^2 . The field is varied rapidly (at a frequency of 3.5 kc/s) to examine the fast changes, and by simple switching to examine the slow changes. The current through the specimen is fixed by inserting a large series resistance; the voltage drop across the specimen is measured. A differential amplifier of gain about 2000 and of pass band from 10 c/s to 10 kc/s is used to eliminate the parasitic signal resulting from

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capacity pick-up (the gain for signals in the same phase at both inputs is less than 1). A special cathode follower with a double π -types LC filter precedes the amplifier. Special precautions are taken to filter the alternating voltage very thoroughly in order to eliminate interference from high harmonics, which are very readily transferred from the high-voltage source producing the external electric field to the input of the amplifier. The magnet is used to alter the carrier concentration, which alters the mean lifetime and hence the concentration, but does not affect the mobility. A few results are given for Ge to illustrate the operations of the differential amplifier and other units. (The circuits are those given by Madelung and Banbury, Refs 14 and 16, with certain minor improvements, the main one of which is an improved device for balancing out the parasitic

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signal to the differential amplifier).
Card 3/3 There are 14 figures and 18 references, of which 11 are
Soviet, 5 are German and 2 are English.

ASSOCIATION: Institut poluprovodnikov AN SSSR
(Institute of Semiconductors, Ac.Sc. USSR)

SUBMITTED: March 3, 1958

Sorokin, O. V.

S/181/60/002/007/023/042
B006/B060

AUTHORS: Sorokin, O. V., Tuseyev, B. T.

TITLE: Comparative Study of the Magnetic Concentration Method
and the Photoelectric Method of Measuring the Surface Recombination Rate 21

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1533-1535 ✓B

TEXT: In continuation of previous papers the authors report here on their measurements of the surface recombination rate by means of two methods that had been already discussed in Refs. 1, 6. Δs was measured from the second harmonic with a setup described here, whose block diagram is shown in Fig. 1. The function of the various blocks is discussed and some problems concerning calibration are briefly dealt with. Prior to the measurements proper concerning the modulation of the surface recombination rate by the method of the "traveling light beam", the minority carrier lifetime and the diffusion coefficient were measured among other things. After experiments on modulation, the surface under examination was ground, and the surface recombination rate was again measured by the method of the

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Comparative Study of the Magnetic Concentration
Method and the Photoelectric Method of Measuring
the Surface Recombination Rate

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B006/B060

"traveling light beam" (Refs. 3, 8). The results were compared. Fig. 2 shows a comparison of results concerning the variation with time of the surface recombination rate, obtained by the method of the second harmonic (full line) and obtained by the method of the "traveling light beam" (dots). Highly homogeneous single crystals of n-type germanium were used for the experiments. The initial s-value was $s_0 = 600$ cm/sec. It is established from the investigations that both methods lead to correct results. There are 2 figures and 13 references: 11 Soviet and 1 German. ✓B

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad
(Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: December 4, 1959

Card 2/2

25689

B/101/61/003/007/011/023
B102/B214

24.7700

AUTHORS: Petrusevich, V. A., Sorokin, O. V., and Kruglov, V., I.

TITLE: Applicability of the parameter of the "effective surface recombination rate" for Ge and Si

PERIODICAL: Fizika tverdogo tela, v. 3, no. 7, 1961, 2023-2030

TEXT: The object of the authors was to demonstrate experimentally that cases in which the parameter of the "effective surface recombination rate" cannot be used for the characterization of the Si surface are realizable in practice, and that this parameter can be used generally for the characterization of Ge surfaces treated by the usual etching agents. The fact that the application of the effective surface recombination rate S_{eff} is not always justified has been referred to by Shockley and Read (Phys. Rev. 87, 835, 1952). Also the conditions of applicability of this parameter were theoretically studied earlier. The authors of the present paper investigated n-type and p-type germanium with a conductivity close to intrinsic conductivity, and also n-type and p-type silicon with resistivities of 10 to 130 ohm-cm. After establishing the ohmic contacts the surfaces of the individual samples were treated differently, i. e.,

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Applicability of the parameter ...

etched by different agents and under different conditions. The method of measuring the field effect has been described elsewhere by Sorokin (PTE, No. 2, 68, 1959). The change $\Delta\sigma$ of conductivity related to the change of Ψ was determined from the field effect, and thus S_{eff} was found out.

Indeed, $S_{eff} = \frac{1}{\tau} \int_0^{\Psi_0} \Psi(x) dx$, where $\Psi(x)$ is the height of the surface potential barrier as a function of the coordinates, and τ is the volume lifetime of the nonequilibrium carriers. The thickness d of the barrier is defined as the normal distance from the surface where $\Psi = \Psi_0$ up to the place where $\Psi = 1$. The known theoretical relation $\Delta\sigma = f(\Psi)$ is used for the determination of Ψ_0 (J. R. Schrieffer, Phys. Rev. 97, 641, 1955). The results of the investigations are given in a table. The positive values of Ψ_0 correspond to the blocking and inversion barriers, and the negative values to the anti-blocking barriers. Of particular interest are the results for Si, as only hypothetical data exist on the effects of the above-mentioned etching agents. For example, a strong blocking or even an inversion layer appears on p-type Si after it has been etched according to method 4, while either a weakly blocking or an anti-blocking barrier appears in n-type Si. All

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B102/B214

Applicability of the parameter ...

experiments were carried out in room atmosphere. The Table also contains data on the surface recombination rate calculated from the curves of the spectral distribution of photoconductivity. The following conclusions can be drawn from the results: 1) For sufficiently high surface potential barriers and the usual values of the diffusion length, a case is realizable in practice in which the notion of S_{eff} loses all sense. The higher the resistance of the sample, the lower is the value of Y_0 for which this will be the case, because ϕ increases with q . It is, therefore, to be expected that for semiconductors having a forbidden band width larger than that of germanium, the parameter S_{eff} will not be applicable for relatively small Y_0 . 2) All conclusions which are based on the application of S_{eff} or τ_{eff} should be revised, and it should be investigated whether the criteria for the applicability of S_{eff} are fulfilled. This holds, above all, for the band structure of surface semiconductors with which S_{eff} or τ_{eff} is used as a function of Y_0 . 3) It is necessary to improve the theory of

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25689

S/181/61/003/007/011/023
B102/B214

Applicability of the parameter ...

effects in which surface properties are involved, and to determine the role of the geometry of the potential barrier. 4) The criteria for the applicability of S_{eff} should also be improved. Above all, it should be kept in mind that τ in the surface charge layer is in general not equal to τ in the volume of the semiconductor. The authors thank G. Ye. Pikus, and G. L. Bir for discussions. There are 4 figures, 1 table and 14 references: 9 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors, AS USSR, Leningrad)

SUBMITTED: January 14, 1961 (initially) and February 10, 1961 (after revision)

Card 4/6

L 18990-63

EWT(1)/EWP(q)/EWT(m)/BDS

AFFTC/ASD/ESD-3/IJP(C)

GG/JD/JG

ACCESSION NR: AT3002450

S/2935/62/000/000/0164/0174

67
63

AUTHOR: Petrusevich, V. A.; Sorokin, O. V.

TITLE: Effective rate of surface recombination and criteria of its applicability [Conference on Surface Properties of Semiconductors, IV Institute of Electrochemistry, AN SSSR, Moscow, 5-6 June, 1961]

SOURCE: Poverkhnostnyye svoystva poluprovodnikov. Moscow, Izd-vo AN SSSR, 1962, 164-174

TOPIC TAGS: recombination, surface recombination, semiconductor-surface recombination

ABSTRACT: Experimental verification of theoretical conclusions arrived at by G. L. Bir (Physics of solid-state body, 1, 67, 1959) is reported. Criteria of applicability of the effective rate of surface recombination (ERSR) have been established; the effect of the geometry of the near-surface space charge upon the spectral distribution of photoconductivity (SDPC) and photomagnetic effect (PME) has been clarified. Near-intrinsic-conductivity Ge and 10-130-ohms-cm Si were used in the experiments. Usual etching methods caused high surface

Card 1/2

L 18990-63

ACCESSION NR: AT3002450

potential barriers in Ge and Si.²¹ The diffusion length and coefficient of ambipolar diffusion measured by SDPC and PME methods gave very close results, while ERSR values measured by the same methods differed widely. In some cases, theoretical and experimental SDPC curves did not agree. Hence, ERSR is inapplicable in many important practical cases, such as the treated surface of Si. On the basis of the above facts, more accurate formulas for computing parameters of SDPC and PME have been developed by the authors. "In conclusion, the authors are deeply grateful to G. Ye. Pikus and G. L. Bir for their interest in the work and useful advice." Orig. art. has: 4 figures and 19 formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR (Institute of Semiconductors, AN SSSR)

SUBMITTED: 00

DATE ACQ: 15May63

ENCL: 00

SUB CODE: PH

NO REF SOV: 008

OTHER: 005

Card 2/2

S/109/63/008/002/010/028
D413/D308

AUTHORS: Iorish, A.Ye., Krasin'kova, M.V., Moyzhes, B.Ya.,
and Sorokin, O.V.

TITLE: The thermal emf, electric conductance and resistance
variation in a magnetic field of barium-strontium
oxide

PERIODICAL: Radiotekhnika i elektronika, v. 8, no. 2, 1963,
269-278

TEXT: Although a number of papers have dealt with measure-
ments of thermal emf, $\Delta p/p$ in a magnetic field, and electrical con-
ductance of cathode oxide coatings, these data have been considered
in isolation. Here they are all examined together in the light of
the accepted theory that conduction in oxide coatings occurs through
the pores, which are filled with electron gas by thermionic emission
from their walls. First a theoretical treatment is given for the val-
ues of thermal emf, conductance and $\Delta p/p$ for the electron gas in
the pores, and then experimental results for barium-strontium oxide

Card 1/2

S/109/63/008/002/010/028
D413/D308

The thermal emf, ...

are presented and discussed. The linear relation of $\Delta\varphi/\rho$ to H in weak magnetic fields is explained: the work function relative to the bottom of the conduction zone is evaluated: the dimensions of the pores for maximum conductance are calculated with allowance for the space-charge in the pores. There are 2 figures.

SUBMITTED: April 26, 1962

Card 2/2

MISSION NR: AP4017600

S/0109/64/009/002/0300/0307

AUTHOR: Dubova, T. A.; Iorish, A. Ye.; Krasin'kova, M. V.;
Khes, B. Ya.; Petrov, I. N.; Sorokin, O. V.; Chudnovskiy, F. A.

TITLE: Electrical conductivity and thermo-emf of a barium-strontium oxide in
a magnetic field

SOURCE: Radiotekhnika i elektronika, v. 9, no. 2, 1964, 300-307

TOPIC TAGS: electrical conductivity, thermo emf, oxide coated cathode,
barium strontium oxide, barium strontium oxide thermo emf, barium strontium
oxide conductivity

ABSTRACT: Measurements were taken of factory specimens of Ba-Sr oxide,
100-200-microns thick, placed between two cylindrical nickel bases (see
Enclosure 1) and subjected to a transverse magnetic field. One of the tubes was
equipped with a ring anode and served to measure the thermo-emission from the

Card 1/12

ACCESSION NR: AP4017600

the surface of the oxide. The effect of temperature and the magnetic field on the resistivity and thermo-emf of the Ba-Sr oxide was investigated. Estimated from experimental results, the free-path length of an electron in the cathode pores is 4-30 microns and the electron mobility is from 3.5×10^4 to 2×10^5 cm²/v sec for the various specimens. The thermodynamic work function, electron concentration, and conductivity are also estimated. It is inferred that the pores in the oxide cathode must be open and intercommunicating and, therefore, that under total thermionic-current conditions, the electrons must be emitted by the entire near-surface layer of the oxide; this fact may, in part, explain the abnormally high Schottky effect in oxide cathodes. Orig. art. has: 7 figures, 13 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 30Dec62

DATE ACQ: 18Mar64

ENCL: 01

SUB CODE: GE

NO REF SOV: 001

OTHER: 003

Card 2132

ACCESSION NR: AP4043679

S/0109/64/009/008/1447/1457

AUTHOR: Iorish, A. Ye.; Moyzhes, B. Ya.; Sorokin, O. V.;
Chudnovskiy, F. A.

TITLE: Temperature distribution in a cathode oxide coating

SOURCE: Radiotekhnika i elektronika, v. 9, no. 8, 1964, 1447-1457

TOPIC TAGS: oxide cathode, electron tube, electron tube cathode,
(Ba Sr Ca) CO₃ cathode, (Ba Sr) CO₃ cathode

ABSTRACT: The theoretical and experimental investigation of the temperature distribution in an oxide-coated cathode is reported. The theoretical part differs from the well-known work of H. C. Hamaker (Philips Res. Repts., 1947, 2, 55-67, 103-111, 112-125) in that the temperature drop in the oxide is not assumed small, and an allowance is made for the Joule heat in the oxide, for the refractive index of the oxide, and for the radiation reflected by the anode. The experimental part includes measuring the thermal conductivity (10^{-5} - 3×10^{-6} w/cm-degree) of oxide-coating grains at temperatures ranging from room temperature

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ACCESSION NR: AP4043679

down to liquid-nitrogen temperature. It is estimated that the temperature of the oxide may be higher than that of the cathode base by hundreds of degrees when heavy emission currents are involved; a still higher difference is possible under pulsed operating conditions of the tube. The anode reflection has an essential effect on the temperature distribution. Hot spots on the cathode due to low thermal conductivity at heavy emission or due to an insufficient rate of heat removal from an underheated cathode may result in sparking; a formula giving a criterion of the cathode thermal instability is offered. The heat radiation capacity of a Ni-base oxide cathode was measured; the radiation dissipation factor, which corresponds to a photon free-path length of 30—50 microns at 800—900C, is estimated. Orig. art. has: 5 figures, 31 formulas, and 2 tables.

ASSOCIATION: none

SUBMITTED: 15Jun63

SUB CODE: EC

NO REF SOV: 005

ENCL: 00

OTHER: 011

Card 2/2

ACCESSION NR: AP4044875

S/0020/64/157/006/1325/1328

AUTHOR: Sorokin, O. V.; Samarin, Yu. P.; Odintsov, I. A. (Deceased,
Corresponding member AN SSSR)

TITLE: Design for creep of beams under flexure

SOURCE: AN SSSR. Doklady* v. 157, no. 6, 1964, 1325-1328

TOPIC TAGS: creep, beam flexure, beam creep, creep analysis,
bending creep, flexural creep

ABSTRACT: The creep of a beam under pure flexure is analyzed by linearizing the set of equations describing a four-element elasto-viscous model used in investigation of problems associated with deformation of materials at high temperatures. It is assumed that the elastic and viscous characteristics of the model materials are stress- and time-dependent (obtained by creep testing under constant stress) and can be represented by piecewise-constant functions. The initial set of equations is thus converted into a linear one with discontinuous coefficients. The procedure of the creep

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ACCESSION NR: AP4044875

analysis is outlined and illustrated by an example. A way of simplifying the method by replacing the variable characteristics of the model by their averaged quantities is indicated, and the equation of the curvature of the neutral axis of the beam is given. The single terms in this equation show the amount of elastic, elastoplastic, and plastic deformation. The authors regret that because of lack of experimental data no conclusion can be made on the feasibility and applicability limits of this method. Orig. art. has: 4 figures and 12 formulas.

ASSOCIATION: none

SUBMITTED: 19Nov63

ATD PRESS: 3090

ENCL: 00

SUB CODE: AS

NO REF SOV: 002

OTHER: 000

Card 2/2

SOROKIN, C.V.; IJERACHEV, Ya.I.

Method for fast loading of specimens in tensile tests.
Zav. lab. 31 no. 3:381-382 '65. (MIRA 18:12)

1. Kuybyshevskiy politekhnicheskii institut.

L 14824-65 EWT(m)/EWF(w)/EWA(d)/EWP(t)/EWP(b) ASD(f)-2/SSD/AFWL/AFTC(p)
JD

ACCESSION NR: AP4048030

S/0020/64/158/006/1285/1286

AUTHORS: Sorokin, O. V.; Oding, I. A. (deceased; Corresponding member AN SSSR) B

TITLE: Concerning creep under pulsating stress

SOURCE: AN SSSR. Doklady*, v. 158, no. 6, 1964, 1285-1286

TOPIC TAGS: creep characteristic, creep mechanism, stress analysis, strain measurement, rate of deformation

ABSTRACT: It is shown that the strain-time curve under pulsating stress can be derived from the creep curve obtained under time-constant load, by simulating the high temperature deformation process by a system consisting of two elastic and two viscous elements, as shown in Fig. 1 of the enclosure. A graphic construction for plotting the strain-time is demonstrated. This analysis explains how creep is affected by intermissions during the tests and how seem-

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L 14824-65

ACCESSION NR: AP4048030

ing disparities in the behavior of material under creep at constant stress and under stress relaxation still lead to results that agree with the theoretical calculations. Orig. art. has: 4 figures.

ASSOCIATION: Kuyby*shevskiy politekhnicheskiy institut im. V. V. Kuyby*sheva (Kuyby*shev Polytechnic Institute)

SUBMITTED: 19Nov63

ENCL: 01

SUB CODE: AS

NR REF SOV: 000

OTHER: 000

Card 2/3

L 14824-65

ACCESSION NR: AP4048030

ENCLOSURE: 01

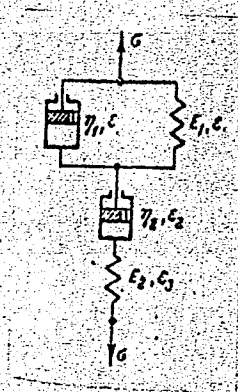


Fig. 1. Model of high-temperature deformation of bodies

Card 3/3

SAVOV, N.; SOROKIN, P.; KALICHEVA, Iv.

Studies of various mycobacteria isolated from animals having reacted to tuberculin. Izv Vet inst zaraz parazit 8:17-24, '64

IVANOV, Iv.; SOROKIN, P.

Comparative studies on the amino acid composition in *Listeria monocytogenes* and *Erysipelothrix insidiosa*. Izv Vet inst zara~~z~~
parazit 8:41-44 *64

SOROKIN, P.

Biosynthesis of citric acid by means of *Aspergillus niger*. Doklady
BAN 17 no.6:581-584 '64.

1. Submitted by Corresponding Member D. Mateev.

SOROKIN, P. A.

Sorokin, P. A. - "Change in the cardiovascular system during acute hepatitis,"
Sbornik trudov (Voen.-med. akad. im. Kirova), Vol. XLIII, 1949, p. 140-43

SO: U-4355, 14 August 53, (Letopis 'Zhurnal 'nykh Statey, No. 15, 1949.)

Country : USSR
 Category: : Human and Animal Physiology, Circulation
 Abs. Jour. : Ref Zhur Biol, No. 2, 1959, No. 8060
 Author : Sorokin P.A.; Mitropol'skiy, A.N.; Gadzhiyev, S.A.
 Institut. : Bleskina T.G.
 Title : Changes in Certain Indices of the Functional State of the Cardiovascular System in Patients with Mitral Stenosis After Commissurotomy.
 Orig. Pub. : Terapevt. arkhiv, 1957, 29, No. 3, 3--9.

Abstract : The study included 50 patients ranging in age from 17 to 43. Prior to surgery it was established that in 41 of the patients mitral insufficiency was present as well as stenosis, while the other 9 had pure mitral stenosis. In 46 patients the stenosis was of grades III and IV, and in the other 4 it was of grade II. The status of the circulation was evaluated by means of the arterial and venuous pressure (the Waldman method) and cardiac systolic volume, determined by the N.N.Savitskiy mechanocardiograph and acetylene method or calculated from Starr's

Card: 1/2
 Clinic Soc. Therapy & Surgical Clinic for Advanced Physicians, Mil-Med Acad in Kiror

Category : Human and Animal Physiology, Circulation

Abs. Jour. : Ref Zhur Biol, No. 2, 1959, No. 8060

Author :
 Institut. :
 Title :

Orig Pub. :

Abstract : formula. One to two months after commissurotomy grade I mitral stenosis was detected in 5 patients, grade II in 31 patients, grade III in 11 and grade IV in 3. Six months to 2 1/2 years following the operation signs of grade I mitral stenosis were found in 3 out of the 25 patients followed, grade II in 17, grade III in 3 and grade IV in 2. The absence of improvement in cardiovascular function in 5 patients the author explains by postoperative complications and inadequate dilatation of the mitral orifice.--
 T.S.Vinogradova

Card: 2/2

I 42191-65 EWG(j)/EWG(r)/EWT(1)/FS(v)-3/EWG(v)/EWG(a)-2/EWG(c) Pb-4/
Pe-5 AFPTC/AFMDC/AMD/APGC DD
ACCESSION NR: AT5010604 UR/3147/64/003/000/0091/0105

AUTHOR: Gramenitskiy, P. M.; Sorokin, P. A.

TITLE: Mechanism of changes in respiration and circulation in dogs exposed to oxygen under high pressure

SOURCE: AN SSSR. Institut evolyutsionnoy fiziologii. Funktsii organizma v usloviyakh izmenennoy gazovoy sredy, v. 3, 1964, 91-105

TOPIC TAGS: oxygen poisoning, high pressure respiration, circulation pressure chamber, oxygen

ABSTRACT: The authors studied 17 dogs weighing 12--17 kg under urethane anesthesia, administered in a 2/3 dose before and a 1/3 dose after fixation on a table. The average dose of administered urethane was 1.2 g/kg. In cases where respiration was accelerated, morphine was administered. Heparin was also given to prevent coagulation in the blood-pressure monitoring device. After anesthesia, tracheotomy was performed and a canule was introduced into the femoral artery to measure arterial pressure. The prepared animals were placed in a pressure chamber containing a kymograph for recording respiration, lung ventilation, and blood pressure.

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L 42191-65

ACCESSION NR: AT5010604

EKG's were also recorded at various intervals throughout the experiments. The pressure in the chamber was maintained at 6 atm (except for the 3 control tests), and the dogs breathed nearly pure oxygen (nitrogen content, 1-2%). Exposure conditions varied according to the purpose of the tests.

A total of 26 tests were conducted. In 7 tests, animals with intact nervous systems were exposed to high oxygen pressures. In 11 tests, animals underwent vagotomy, resection of the subclavian loop, or complete cardiac denervation prior to the action of oxygen or at various periods during oxygen poisoning. In 8 tests, the splanchnic nerves were resected and the adrenal glands were ligatured. In all tests, the animals were observed for initial symptoms of oxygen poisoning.

The experiments revealed that the course of oxygen poisoning in anesthetized dogs could be divided into 4 periods. The first period was characterized by decreases in lung ventilation and cardiac activity and was adaptive in nature. The vagus nerve played the basic role in these protective reactions. The second, preconvulsive period was characterized by hyperventilation, tachycardia, and increased arterial pressure which re-

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L 42191-65

ACCESSION NR: AT5010604

flected the participation of the adrenosympathetic system. These reactions were deleterious, since they accelerated the onset of oxygen poisoning. In the third period, convulsions took place. This period was characterized by a gradual decrease in cardiac rhythm which became tachycardia as soon as convulsions occurred. At the end of this period there was a parasympathetic effect with a background of respiratory inhibition which led to bradycardia, nodal rhythm, or cardiac block. These disruptions of cardiac rhythm were reversible and could be eliminated by vagotomy. The fourth period was characterized by a sharp increase in blood pressure and accelerated cardiac activity (sinus tachycardia). When respiration had ceased, arterial pressure fell but cardiac activity persisted. At the end of this period bradycardia and cardiac block occurred which could not be eliminated by vagotomy. It was found that preliminary resection of vagus nerves eliminated the decrease in cardiac activity during the first three periods of oxygen poisoning and therefore hastened the onset of convulsions and shortened the survival period of the animals. Preliminary ligature of the adrenals increased the survival time of dogs exposed to 6 atm oxygen and inhibited the development of convulsions. A similar but more pronounced effect was produced when splanchnic nerves were also eliminated. This effect can be explained

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L 42191-65

ACCESSION NR: AT5010604

as a function of the removal of the adrenosympathetic system and the consequent increased blood deposition and, in connection with this factor, decreased blood supply to tissues as well as lowered oxidation processes. Following adrenal isolation and disruption of splanchnic and cardiac sympathetic nerves, those protective parasympathetic reactions noted in the cardiac activity of intact animals did not occur, in spite of the preservation of vagus nerves.

The authors conclude by commenting on the role of the adrenosympathetic system in reactions to high oxygen pressures. On one hand the system must play a significant role in toxic manifestations of high-pressure oxygen by inhibiting parasympathetic cardiovascular protective reactions. On the other hand, the system must participate in the development of these very protective reactions.

Orig. art. has 6 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: LS, PH

NO REF SOV: 011

OTHER: 009

ATD PRESS: 3240-F

Card 4/4 1102

L 42001-65 EWG(j)/EWG(r)/ENT(1)/FS(v)-3/ENG(v)/EWG(a)-2/ENG(a) Pa-5 DD
ACCESSION NR: AT5010605 UR/3147/64/003/000/0106/0115

AUTHOR: Groshikov, M. A.; Sorokin, P. A.

TITLE: Pathomorphological changes in the lungs of animals exposed to high oxygen pressure

SOURCE: AN SSSR. Institut evolyutsionnoy fiziologii. Funktsii organizma v usloviyakh izmenennoy gazovoy sredy, v. 3, 1964, 106-115

TOPIC TAGS: oxygen pressure, lung, oxygen effect, hemorrhage

ABSTRACT: The changes caused by high oxygen pressure in dogs and guinea pigs are essentially the same. Expansion and hyperemia of the veins and capillaries, sometimes with hemorrhages in the surrounding tissues and in the lumens of the alveoli are observed in the lungs as well as perivascular edema, thickening of the inter-alveolar walls due to edema and dilatation of the capillaries, and varying degrees of atelectasis. Lung injury was combined with more or less pronounced congestion in the other viscera. Adrenalectomy in the dogs, especially when combined with division of the splanchnic nerves, reduced the pathological effects of high oxygen pressure on the lungs. This confirms the importance of humoral factors in pulmonary lesions resulting from acute oxygen poisoning. Division of the splanchnic

Card 1/2

L 42001-65

ACCESSION NR: AT5010605

nerves causes hyperemia in the viscera. Congestion and pulmonary edema are relieved by reducing the amount of circulating blood. This explains why the combination of adrenalectomy and splanchnicectomy alleviates the adverse pulmonary effects of high oxygen pressure. Orig. art. has: 6 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: LS

NO REF SOV: 007

OTHER: 012

ee
Card 2/2

L 42190-65 EWG(j)/EWG(r)/EWT(1)/FS(v)-3/EWG(v)/EWG(a)-2/EWG(c) Pb-1/
Pe-5 AFFTC/AFMDC/AMD/APGC DD

ACCESSION NR: AT5010606

UR/3147/64/003/000/0116/0125

30
B+1

AUTHOR: Sorokin, P. A.

TITLE: Changes in cardiac electrical activity in animals exposed to high oxygen pressures

SOURCE: AN SSSR. Institut evolyutsionnoy fiziologii. Funktsii organizma v usloviyakh izmenennoy gazovoy sredy, v. 3, 1964, 116-125

TOPIC TAGS: high pressure respiration, oxygen, pressure chamber, oxygen poisoning, cardiovascular system, bioelectricity, EKG

ABSTRACT: The authors studied the effects of oxygen poisoning on the heart bioelectricity of guinea pigs and dogs. The first series of experiments was conducted on intact guinea pigs placed on their backs and held rigidly in place by their hind quarters. Needle electrodes were fixed subcutaneously for the EKG pickup. The animals were situated in a 65-liter chamber in which the electrodes were connected to EKG leads. The first group of tests took place under pressures of 1.0, 2.0, and 3.0 atm for 150--180 min (27 experiments). EKG's were registered before, during, and after pres-

Card 1/4

L 42190-65

ACCESSION NR: AT5010606

sure tests. In addition, heart bioelectricity was studied during convulsive forms of severe oxygen poisoning under pressures of 5.5 atm (16 experiments). In 8 experiments with guinea pigs at 5.5 atm, a 1-mg/kg solution of atropine was injected subcutaneously. In all tests, oxygen content ranged from 92 to 96% and carbon dioxide content from 0.05 to 0.2%.

The second series of experiments was conducted on dogs anesthetized with urethane. Of 15 experiments, 6 were on intact animals, 7 were on dogs vagotomized prior to the action of oxygen, and 2 were on dogs which underwent cardiac denervation during severe, convulsive oxygen poisoning. All tests took place in a large pressure chamber in which animals were exposed to 6 atm. Nitrogen content did not exceed 2%. EKG's were recorded before, during, and after the tests.

The results of the experiment revealed that in the initial period of acute oxygen poisoning there was a sharp decrease in sinusoidal rhythm, often extrasystole, and also sinoauricular block and disruption of atrio-ventricular conductivity in intact guinea pigs. Cardiac block and, less often, nodal or idioventricular rhythm was observed during the convulsive

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L 42190-65

ACCESSION NR: AT5010606

period of oxygen poisoning. During the terminal period, sinusoidal tachycardia was observed in dogs which changed to bradycardia and transverse block when breathing had stopped. Preliminary atropine injections or resection of vagus nerves eliminated decreased cardiac rhythm, sinoauricular block, and disruption of atrioventricular conductivity, both in the initial and convulsive periods of acute oxygen poisoning, but did not prevent bradycardia or cardiac block in the terminal period. Sinusoidal tachycardia at the beginning of the terminal period followed heart block or heterotropic rhythm and was not eliminated by resecting sympathetic nerves leading to the heart. Displacement of the R(S)-T segment with negative "gigantic" T-waves during the simultaneous decrease in voltage of R spikes was considered as a manifestation of myocardial hypoxia which evidently developed as a result of tissue respiration inhibition during acute oxygen poisoning. The disruption of cardiac rhythm and other bioelectrical shifts which occurred during the convulsive period of acute oxygen poisoning were temporary in nature and quickly disappeared when high oxygen pressures were terminated.

Orig. art. has 5 figures.

Card 3/4

L 42189-65 EWG(a)-2/EWG(c)/EWG(j)/EWG(r)/EWG(v)/EWT(1)/FS(v)-3 Pb-4/
Pa-5 AFFTC/AFMDC/AMD/APJC DD

UR/5147/64/003/000/0126/0131

ACCESSION NR: AT5010607

AUTHOR: Sorokin, P. A.

TITLE: Change in the amount of circulating blood in dogs breathing oxygen
under pressures of 1.0 and 2.0 atm

SOURCE: AN SSSR. Institut evolyutsionnoy fiziologii. Funktsii organizma v
usloviyakh izmenennoy gazovoy sredy, v. 3, 1964, 126-131

TOPIC TAGS: respiration, oxygen, dog, pressure chamber, high pressure respiration,
circulation

ABSTRACT: The authors studied quantitative changes in blood circulation of dogs
breathing pure oxygen at pressures of 1.0 and 2.0 atm. All experiments
were performed in a pressure chamber. The dogs breathed both normal
air and oxygen through masks while lying on their left sides. The amount
of time between experiments for each dog ranged from 1 to 2 weeks so
that conditioned reflexes to the respiratory mask would not develop. On
the day of a typical test, dogs were weighed, placed in the pressure cham-
ber with masks on, and given first normal air to breath and then oxygen

Card 1/3

L 42189-65

ACCESSION NR: AT5010607

at 1.0 and 2.0 atm. After 3 to 4.5 hr, quantitative analysis of blood circulation took place. Blood flow was monitored by the Gregersen method (1944) using Evans blue.

In 20 control experiments where animals breathed normal air, the flow of plasma was 42.2—53.0 ml/kg (mean flow, 47.3 ml/kg). The volume of blood circulation was 84.4 ml/kg (76.0—93.0 ml/kg). When animals breathed oxygen at normal pressure, the amount of circulating plasma was 41.8 ml/kg (39.1—44.0 ml/kg), which represented a 12% decrease from the control level. Blood circulation was 75.6 ml/kg (66.2—83.8 ml/kg). In 10 of 13 experiments at 2.0 atm, plasma circulation decreased by 11.6%; blood circulation decreased by 9.4% in 9 experiments. Thus the hemodynamics of animals breathing 2.0-atm oxygen was essentially the same as for those breathing 1.0-atm oxygen.

It was concluded that the quantity of circulating blood was often sharply decreased in animals breathing oxygen under 1.0 and 2.0 atm of pressure. This decrease was considered as an adaptive reaction of the organism to the increased partial pressure of oxygen in respired air.

Card 2/3

L 42189-65

ACCESSION NR: AT5010607

Orig. art. has 3 figures and 2 formulas.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: LS, PH

NO REF SOV: 003

OTHER: 009

ATD PRESS: 3240-F

β-0
Card 3/3

SOROKIN, P. G.

② elec

Electrical Engineering Abstracts
May 1954
Switchgear

1954. On the extinction of arcs in apparatus for the switching of high-power d.c. direct-current networks. G. A. KUKEROV AND P. G. SOROKIN. *Elektrichestvo*, 1953, No. 10, 20-4. in Russian.

Description of experimental work on conventional compressed-air circuit breakers, assisted by an oscillatory circuit shunting the arc. The main d.c. was simulated by 50 c/s currents of up to 125 A at 50 kV. The capacitor of the oscillatory circuit was initially charged to about 10 kV, freely oscillating at 300-1000 c/s, with a current amplitude of about double the main current. Oscillograms are given of the extinguishing action without and with the oscillatory circuit, and it is concluded that the method is applicable to 400 to 800 kV d.c. power switching. F. QUELON

Leningrad Polytech Inst. for im. Kalinin (for Kukerov)
Sci. Res. Inst. of Direct Currents (for Sorokin)

②

SOV/105-59-3-5/27

8(3)

AUTHORS:

Kukekov, G. A., Candidate of Technical Sciences, Docent,
Sorokin, P. G., Engineer, Shipulina, N. A., Candidate of Technical
Sciences (Leningrad)

TITLE:

Switch-off Contactors for High-tension Direct Current Transmission
Lines (Otklyuchayushcheye ustroystvo dlya liniy postoyannogo toka
vysokogo napryazheniya)

PERIODICAL:

Elektrichestvo, 1959, Nr 3, pp 24-27 (USSR)

ABSTRACT:

The use and the further development of d.c. long-distance trans-
mission lines in many respects depends upon the creation of new
electrical equipment and installations. Such devices include con-
tactors designed to disconnect powerful and highly inductive high-
tension d. c. circuits. The principal difficulty encountered in
this problem consists of the fact that it is much more difficult
to suppress the flashover arc in d. c. circuits than in a. c. cir-
cuits. In the course of the investigations carried out in the
Leningradskiy politekhnicheskii institut im. Kalinina (Leningrad
Polytechnical Institute imeni Kalinin) and at the Institut postoyan-
nogo toka (Institute of Direct Current) (Refs 1,2) it was found that
if the d. c. arc is shunted by an oscillation circuit with cor-
responding parameters and initial conditions - the current in the

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SOV/105-59-3-5/27

Switch-off Contactors for High-tension Direct Current Transmission Lines

arc changes its direction and hence that it may pass through zero. As was shown by experiments, this provides a means of extinguishing the arc in arc-suppression devices of high-tension alternating current contactors, even if the frequency of the oscillations is somewhat higher (500 - 1000 cycles). In this paper a short analysis of the performance of contactors designed on this principle and a description of the experiments carried out with these contactors is given. This model contactor was tested at the rectifier sub-station of the experimental d.c. transmission line from the Kashira water power station to Moscow. Three test series were carried out.

Summary: 1) If a high-tension a.c. arc-suppression device is combined with an oscillation circuit, which shunts the arc generated in the arc-suppression device when the contactor disconnects the line, it is possible to create a device which is able to disconnect high-tension d.c. transmission lines. 2) If the oscillation circuit is designed correspondingly to the arc characteristic, no previous charging of the oscillation circuit capacity is required. 3) At present air contactors are considered to be the most convenient type, because the contacts remain open after disconnecting. The rest charge on the condenser must be destroyed by a special device which is built-in in the contactor. -There are 6 figures and 5 Soviet

Card 2/3

SCROKIN, F. I.

Metal Cutting

Machining of dovetail profiles. Stan. i instr., 23, No. 6, 1952.

Monthly List of Russian Accessions, Library of Congress
November, 1952. UNCLASSIFIED.

SOROKIN, P.I., inzh.

Design of thin-walled elastic rods having open profiles and
continuously varying cross sections along the rod. Trudy Kiev.
avt.-dor. inst. no.3:104-116 '57. (MIRA 11:5)
(Elastic rods and wires)

SOROKIN, P.I., inzh.

Calculation of the stability of automobile frames under the
action of a symmetrical load and in braking the automobile.
Sbor. nauch. trud. KGRI no.7:273-287 '59. (MIRA 16:9)
(Automobiles--Frames)

SOROKIN, P. I., Cand Tech Sci -- (diss) "Application of the theory of V. Z. Vlasov to the calculation of automobile chassis." Kiev, 1960. 15 pp; (Academy of Sciences Ukrainian SSR, Inst of Mechanics); 250 copies; price not given; (KL, 22-60, 139)

SOROKIN, P.I.; POZDNY SHEV, V.M.; POPOV, V.F.; BALINSKIY, V.R.; LESNIKOVICH, S.S.

Casting magnesium iron crankshafts. Lit. proizv. no.5:8-9 My '62.
(MIRA 16:3)

(Crankshafts and cranks)

(Iron founding)

FOMINYKH, I.P.; NOVIKOV, P.T.; SOROKIN, P.I.

Using the primary heat of castings to hasten their annealing.
Lit. proizv. no.4:28-29 Ap '64. (MIRA 18:7)

NOVAKIN, P.I. inzhener.

Using machinery with attachments. Mash. stroi. 14 no. 4:24 Ap '57.
(Earthmoving machinery) (MIRA 10:6)

SOROKIN, P.I.

Calculation methods in zonal over-all mechanization of the
construction of excavated canals by using bulldozers and ex-
cavators. Trudy Inst.vod.khoz.i energ. AN Kir.SSR no.5:
49-86 '59. (MIRA 13:5)

(Excavating machinery)
(Irrigation canals and flumes)

SOROKIN, P. I., Cand Tech Sci (diss) -- "A method of computing the flow organization of work of zonal complexes of machinery in building canals". Frunze, 1960. 27 pp (Min Agric USSR, Tashkent Inst of Engineers of Irrigation and Mech of Agric TIIMSKh), 250 copies (KL, No 14, 1960, 134)

SOROKIN, P.I.; KIRPICHENKO, M.M., red.; BEYSHENOV, A., tekhn. red.

[Over-all mechanization of earthwork operations in construction]
Kompleksnaia mekhanizatsiia zemlianykh rabot v stroitel'stve.
Frunze, Kirgizskoe gos.izd-vo, 1960. 58 p. (MIRA 14:6)
(Earthwork--Technological innovations)

SOROKIN, Pavel Il'ich, kand. tekhn. nauk; GANYUSHIN, A.I., red.;
GORYACHKINA, R.A., tekhn. red.

[Manual for a bulldozer operator] Posobie mashinistu bul'do-
zera. Moskva, Avtotransizdat, 1962. 128 p. (MIRA 15:11)
(Bulldozers)

SOROKIN, P.I., kand.tekhn.nauk

Designing a flow with over-all mechanization in erection of an earth
roadbed. Avt. dor. 26 no.2:24-26 F '63. (MIRA 16:4)
(Road construction)

SOROKIN, P.I.; FOMINYKH, I.P.; BESPALOV, Ya.G.; POBEREZKIN, A.Z.; ZINCHENKO,
A.M.; OSKOLKOV, Ye.A.

Inoculation of cupola cast iron with rare-earth metal alloys.
Lit. proizv. no.9:27-31 S '64. (MIRA 18:10)

SOROKIN, P.M. (Moscow)

Experience in teaching the topic "Percentage." Mat. v shkole
no. 4:49-50 J1-Ag '58. (MIRA 11:7)
(Percentage--Study and teaching)

11/(4)(2)

SOV/92-58-9-21/36

AUTHOR: Sorokin, P.M., Engineer

TITLE: Revision of the Flow Scheme of the Gas Fractionating Unit at the Catalytic Cracking Plant (Izmeneniye skhemy gazofraktsioniruyushchey ustanovki kataliticheskogo krekinga)

PERIODICAL: Neftyanik, 1958, Nr 9, p 22 (USSR)

ABSTRACT: In view of the fact that the catalytic cracking unit of the Omsk refinery is presently being used for processing heavy crudes, its gas fractionating equipment receives a larger quantity of gas. Therefore, it has been found necessary to revise the flow scheme of gas fractionators as follows: the gas under pressure of 13-14 atm proceeds from the reflux tanks of the stabiliser and isopropane tower directly to gasoline mixing chamber (operating under 10 atm pressure) thus bypassing the absorber to which it would have come according to the original flow scheme. As a result of this measure, the load of absorbers of the gas fractionating unit decreased, and the consumption of steam, water, electric power and of gas used by gas motors dropped.

ASSOCIATION: Omskiy NPZ (The Omsk Refinery)

Card 1/1

11(0)

SOV/92-58-10-18/30

AUTHOR: Sorokin, P.M., Engineer

TITLE: Alkylation Unit is Saving Steam (Ekonomiya para na
alkiliruyushchey ustanovke)

PERIODICAL: Neftyanik, 1958, Nr 10, p 25 (USSR)

ABSTRACT: One of the processing units of the Omsk refinery is using 30 atm steam to preheat its feed. This condensed steam having approximately 194° C is brought afterwards to the condensation unit where it boils up for the second time due to the drop in pressure. In this way it becomes possible to obtain from the 30 atm condensed steam an additional quantity of exhaust steam. It is brought from the reboiler through the separator to the exhaust steam line and is used for technical purposes.

ASSOCIATION: Omskiy NPZ (The Omsk Refinery)

Card 1/1

SOROKIN, P.P.

SURNAME (in caps); Given Names

Country: Bulgaria

Academic Degrees: not indicated

Affiliation: not indicated

Source: Sofia, Priroda, No 1, Jan/Feb 61, pp 80-81

Data: "The Analysis of Luminescence in Microbiology."

SOROKIN, P.P.

Amino acid composition of gram-positive and gram-negative bacteria.
Ukr. biokhim. zhur. 37 no.2:239-242 '65.

(MIRA 18:6)

1. Veterinarnyy institut zaraznykh i parazitarnykh bolezney
Bolgarskoy Akademii sel'skokhozyaystvennykh nauk, Sofiya.

SOROKIN P. P.

Oboridovanie vremennykh peregruzocheykh punktov na morskoy poberezh'ye. [Equipment of temporary trans-shipping points on the sea coast]. [Astrakhan'] Morskoy transport, 1942. 70 p. diagr. (Osnovy voenno-morskogo dela).

DLC: TC373.96

SO: Soviet Transportation and Communication, A Bibliography, Library of Congress Reference Department, Washington, 1952, Unclassified.

PRUDENTOV, Aleksandr Ivanovich; SOROKIN, P.P., kand.tekhn.nauk, nauchnyy
red.; NECHAYEV, G.A., red.izd-va; PUL'KINA, Ye.A., tekhn.red.

[Reinforced concrete tubular sectional piles] Zhelezobetonnye
polye sbornye svai. Leningrad, Gos.izd-vo lit-ry po stroit.,
arkhit. i stroit.materialam, 1959. 109 p. (MIRA 12:10)
(Piling (Civil engineering))

GODES, E.G., inzh.; SHASHKOV, S.A., kand. tekhn. nauk; BAUM, V.A., inzh.;
SOROKIN, P.P., kand. tekhn. nauk, retsenzent; LISITSYN, B.V.,
inzh., retsenzent; BESPALOV, I.V., inzh., nauchnyy red.; PENOVA,
Ye.M., red. izd-va; VORONETSKAYA, L.V., tekhn. red.

[Reinforcing river banks near factory grounds]Ukreplenie beregov
rek na zavodskikh territoriyakh; proizvodstvennyi opyt. Lenin-
grad, Gos. izd-vo lit-ry po stroit., arkhitekt. i stroit. materialam,
1961. 134 p. (MIRA 14:10)

(Hydraulic engineering)

SOROKIN, P.P., kand. tekhn. nauk; TSUKERMAN, N.Ya., inzh. Primal
uchastiye PRUDENTOV, A.I., inzh.; KARPOV, V.V., kand. tekhn.
nauk, nauchnyy red.; ZHURAVSKIY, N.A., red. izd-va;
PUL'KINA, Ye.A., tekhn. red.

[Filing] Svainye raboty. Leningrad, Gos. izd-vo lit-ry po
stroit., arkhitekt. i stroit. materialam, 1961. 213 p.
(MIRA 15:3)

(Filing (Civil engineering))

SOROKIN , P.P., kand. tekhn. nauk, nauchn. red.

[Designing and operating plants with straight-flow hydraulic classifiers; for fractionation of sand and gravel mixes]
Proektirovanie i ekspluatatsiia ustanovok s priamotokhnymi gidroklassifikatorami; dlia fraktsionirovaniia peschano-graviinykh smesei. Leningrad, 1962. 151 p.

(MIRA 17:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut gidrotekhnicheskikh i sanitarno-tekhnicheskikh rabot.

GARMASH, V.M.; SOROKIN, P.S.

Testing the SGL photographic deflection measuring device in
crooked boreholes. Razved. i okh. nedr 27 no.4:47-49 Ap '61.
(MIRA 14:5)

1. Lebedinskiy rudnik.
(Lebedi region (Kursk Magnetic Anomaly)—Mine drainage)

SOROKIN, P.V.

24962 Sorokin, P. V. Vnutri Khozraschet Ha Kamskom Kabinete. Bumazh Prom-st'
1949, No 3 s26-30

So: Letopis' No 33, 1949

SOROKIN, P.V.

The Kama Paper Industry Combine in the fifth and sixth five-year plans. Bum.prom. 31 no.1:25-26 Ja '56. (MLRA 9:5)

1. Nachal'nik planovo-ekonomicheskogo otdela Kamskogo tsellyulovno-bumazhnogo kombinata.

(Kama Valley--Paper industry)

KAMENSKIY, A.V., red.; SOROKIN, P.V., red.; CHEREpanov, V.A.,
red.; VERSHININ, T.I., red.izd-va; PASTUKHOV, M.A.,
tekhn. red.

[Twenty-fifth anniversary of the Kama Woodpulp and Paper
Combine] Kamskii tsell'iulozno-bumazhnyi kombinat; 25 let.
Perm', Permskoe knizhnoe izd-vo, 1962. 119 p.

(MIRA 16:4)

(Krasnokamsk--Woodpulp industry)

SOROKIN, P.V.

Following the road toward the increase of labor productivity.
Bum. prom. [38] no.6:19-20 Je '63. (MIRA 16:7)

1. Zamestitel' direktora po ekonomike Kamskogo tsellyulozno-
bumazhnogo kombinata.
(Woodpulp industry--Labor productivity)

SOROKIN, P. V.

Dopuski na razmery stal'nogo fasonnogo lit'ia. (Vestn. Mash., 1949, no. 7)

(Tolerances for dimensions of profile steel castings.)

DLC: TN4,V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union,
Library of Congress, 1953.

[illegible]

SOROKIN, P. V.

Nekotorye osobennosti kontrolya razmerov litykh detalei individual'nogo i melkoseriynogo proizvodstva. (Vestn. Mash., 1951, no. 1, p. 77-80)

Includes bibliography.

(Certain features of dimension control of cast machine parts in individual and small quantity production.)

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union,
Library of Congress, 1953.

KOPYTOV, V.F., kandidat tekhnicheskikh nauk; SOROKIN, P.V.; POPOVA, S.M.,
tekhnicheskiy redaktor.

[Rapid heating of steel] Skorostnoi nagrev stali. Moskva, Gos.
nauchno-tekhn.izd-vo mashinostroitel'noi lit-ry, 1952.21 p.
(Nauchno-tekhnicheskaya informatsiya) [Microfilm] (MIRA 9:4)
(Steel--Heat treatment)

NEKHENDZI, Yu.A.; SOROKIN, P.V.

Effect of the temperature rarefaction and of a mold upon steel
liquidity. Lit.proizv. no.8:17-20 N '54. (MIRA 8:1)
(Founding)

SOROKIN, P. V.

USSR/Miscellaneous-----machine construction

Card 1/1

Authors : Kopytov, V. F., Cand. in Tech. Sci.; Kopitova, G. F., engineer;
and Sorokin, P. V.

Title : Decarbonizing steel in reverbatory furnaces

Periodical : Vest. mash. 34/3, 36-40, Mar/1954

Abstract : The products of burning fuel in a reverbatory furnace at high temperature oxidize steel, producing scales on it, and such oxidation causes oxidation of the carbon in the surface layer of the steel. When the decarbonizing of the surface layer is rapid the decarbonized layer is found under the scale after heating. In order to reduce decarbonization it is necessary during hot processing to heat the steel more rapidly. One Russian reference, dated 1949. Graphs.

Institution :

Submitted :

SOROKIN, P.V.

Largest Russian casting; 80 years of using a cast anvil block
weighing 620 tons. Lit.proizv. no.9:25-27 S'55. (MLRA 8:12)
(Perm--Iron founding)

SOROKIN, P. V.

✓ 4897* High-Strength Pattern Compositions for Precision
Casting. Model'nye sostavy povyshennoi prechnosti dlia
tehnicheskoi lit'ia. (Russian.) P. V. Sorokin and E. K. Alek-
seyevskaya. *Liteinoe proizvodstvo*, 1955, no. 12, Dec., p. 2-4. ①
Polyethylene and its properties. Use and evaluation of paraffin
or ceresin wax and their blends or fusions with polyethylene.
Graphs, tables. 6 ref.

copy

of 2/2

SOROKIN, P. V., Cand. Tech. Sci.; ALEKSEYEVSKAYA, Ye. K. (Eng.);

"The Use of Shell Molds and Fused Quartz in the Production of Investment Castings,"
Metody polucheniya otlivok pobyshennoy tochnosti (Methods of Making High-Precision
Castings), Moscow, Mashgiz, 1958. 140 p.

PURPOSE: This book is intended for engineers and technicians at plants and institutes as well as in research and planning organizations in all branches of the machine-building industry.